A new species of Laughingthrush (Passeriformes: Garrulacinae) from the Western Highlands of Vietnam

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On the basis of field observations and museum diagnosis of three specimens collected from Mount Ngoc Linh in the Western or Central Highlands of Vietnam (Fig. 1), we here describe a new species of laughingthrush *Garrulax*. This new species resembles the polytypic Chestnut-crowned Laughingthrush *G. erythrocephalus* and, to a lesser degree, the monotypic Collared Laughingthrush *G. yersini* in its general morphology, and shares some characteristics with both of them. It appears to be allopatric with its two congeners. We demonstrate that it is a good species according to the phylogenetic and biological species concepts, and argue that *G. erythrocephalus* is a highly variable taxon which requires taxonomic revision and very likely splitting into additional species. To assign this new species to *G. erythrocephalus* would have added yet another level of variability to an already extremely variable taxon.

This new taxon occurs amongst undergrowth in montane evergreen forest between at least *c.* 2,200 and 2,200 m asl and is likely to occur in this habitat and at this altitude elsewhere in the Western Highlands, and possibly in adjacent Laos. We present notes on the ecology, behaviour and conservation of this new species. Following the recent discovery of a new species of barwing *Actinodura sodangorum* in this area (Eames *et al.* 1999), the discovery of this second new species elevates the conservation significance of the wider area to that of an Endemic Bird Area [EBA] (Stattersfield *et al.* 1998).

Mount Ngoc Linh (15°04′N, 107°59′E) at 2,598 m asl is the highest point of the Western Highlands in southern Vietnam. The geographical isolation of Mount Ngoc Linh, combined with its height, and the fact it was ornithologically unexplored, suggested that its avifauna would be interesting and worthy of investigation. Thus it was selected for survey as part of an ongoing project between BirdLife International and the Forest Inventory and Planning Institute (FIPI) which aims to ensure that all internationally important areas for biodiversity conservation are included within the revised system of protected areas.

On Mount Ngoc Linh on 1 May 1996 we observed an unfamiliar laughingthrush *Garrulax* sp. which showed striking similarity to both the Chestnut-crowned Laughingthrush *G. erythrocephalus* and the Collared Laughingthrush *G. yersini*. During the course of the following 18 days we made numerous observations of this undescribed form and obtained a specimen on 15 May 1996. Subsequently, on 17 May 1998, JCE and LTT returned to the proposed Ngoc Linh Nature Reserve to commence management planning activities. During routine biological inventory conducted on Mount Ngoc Linh up to 8 April 1998, we

Plate 1. Adult male Golden-winged Laughingthrush *Garrulax ngoclinhensis* (centre) with Chestnut-crowned Laughingthrush *G. erythrocephalus* (above) and Collared Laughingthrush *G. yersini* (below). Original painting by Kamol Komolphalin.

Plate 2a. Lateral view of Holotype of *Garrulax ngoclinhensis* adult male collected on Mount Ngoc Linh on 15 May 1996. The golden remiges contrasting with the black primary coverts can clearly be seen. Photo: Harry Taylor.

Plate 2b. Ventral view of Holotype of *Garrulax ngoclinhensis* adult male collected on Mount Ngoc Linh on 15 May 1996. Photo: Harry Taylor.

Plate 2c. Lateral view of Holotype of *Garrulax ngoclinhensis* (left) with Holotype of *G. yersini* (centre) and *G. erythrocephalus connectens* (right). Photo: Harry Taylor.

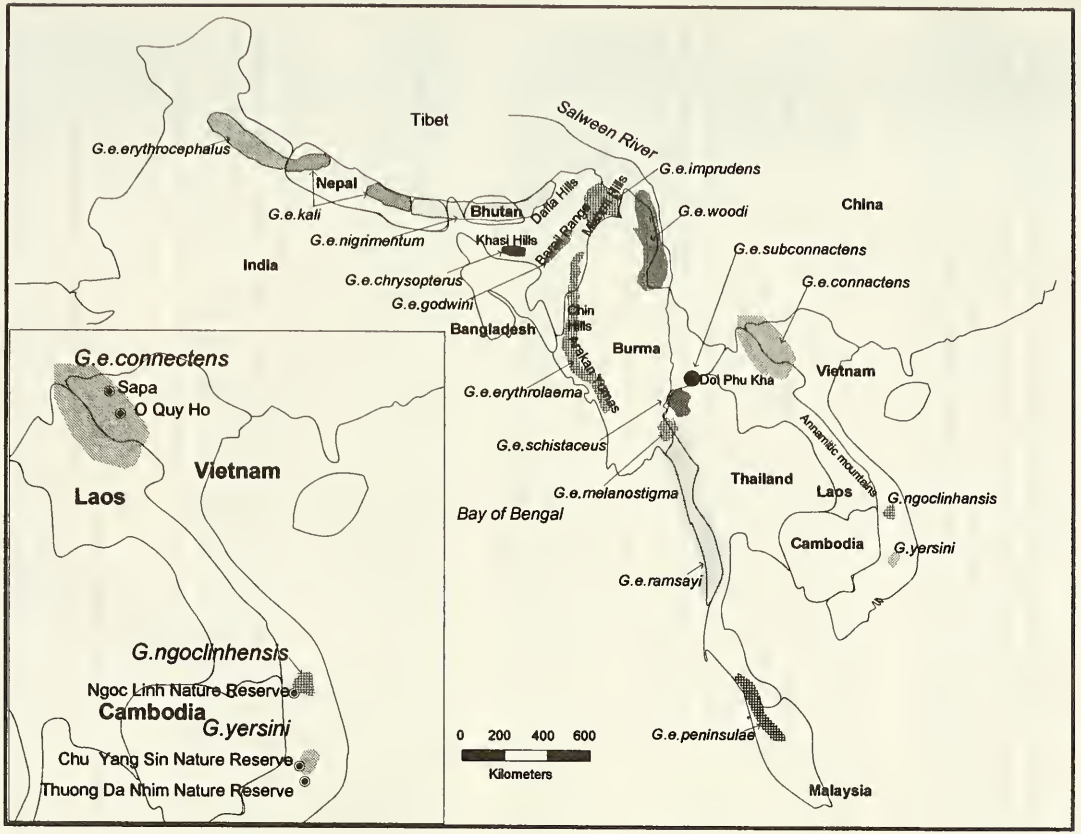

Figure 1. Approximate ranges of *Garrulax erythrocephalus*, *G. ngoclinhensis* and *G. yersini* and localities mentioned in the text.

collected two additional specimens from the same locality. Comparison of two of the three with material in The Natural History Museum, Tring (U.K.) in August 1996, 1997 and 1998 by JCE showed that this bird represents a new species with the genus *Garrulax*, which we name:

Golden-winged Laughingthrush *Garrulax ngoclinhensis*, sp. nov.

Holotype. Deposited in The Natural History Museum, Tring (BMNH No. 1997.7.7), adult male collected on Mount Ngoc Linh (15°04'N, 107°59'E), Kon Tum Province, Vietnam (Fig. 1), at *c.* 2,200 m asl on 15 May 1996 (Plate 1, 2). Enlarged testes, body moult and subcutaneous fat noted.

Diagnosis. *Garrulux ngoclinhensis* most closely resembles *G. erythrocephalus* but shares the combination of black primary coverts and golden outer webs (edgings) of the remiges with *G. yersini* (Plate 1 & 2c). *Garrulax ngoclinhensis* differs from all 14 races of *G. erythrocephalus* in having a dark grey breast, belly, mantle and back, golden outer webs to the remiges, and golden-brown outer webs of the rectrices. *Garrulax ngoclinhensis* differs from the eight *G. erythrocephalus* taxa which occur west of the Salween River (except *G. e. woodi*) by the absence of black or dark brown scaling on the mantle and breast, the presence of a black alula (absent in *G. e. connectens*), and the absence of buff, brown or olive tones in its plumage. It differs from the six forms of *G. erythrocephalus* occurring east of the Salween River in the absence of rich olive, green, dark chestnut and cinnamon tones in the body plumage (excluding the crown).

Description of the holotype. In the following description, a subjective description of a colour is given, followed whenever appropriate by capitalized colour nomenclature and the number as given in Smithe (1975). Where no suitable match could be found, the closest colour is given together with a clarification.

Upperparts: Forehead grey tinged brown (Glaucous 79 and Cinnamon Brown 33) with blackish brown central shaft streaks extending over and behind the eye on to the sides of the head. The centre of the crown, hind-crown and nape are chestnut (Kingfisher Rufous 240, Robin Rufous 340, Raw Sienna 136 and Amber 36, are closest but all are insufficiently orange). The crown feathers are grey with broad chestnut fringes. The mantle, back and rump are grey with a slight olive tinge (Glaucous 79 is closest but lacks olive and is too light). The upper tail coverts are grey tinged slightly more strongly olive-brown than the rest of the upperparts (Brownish Olive 29 and Olive 30 are closest). The graduated tail is comprised of 12 rectrices. The upper surfaces of the tail feathers are olive-brown (Vandyke Brown 121 is closest). The outer webs are tinged golden-brown (Amber 36 but yellower) which is more pronounced in extent and intensity on the basal half of the outer webbing. The underside of the tail is dark brown (Sepia 119) with an iridescent sheen.

Wings: The lesser and median coverts are grey with a slight olive tinge (Glaucous 79 is closest). The greater coverts are olive and are broadly tipped chestnut. The outer web of the alula is golden (Orange Yellow 18) with a slight olive tinge, while its inner web is black. The primary coverts are black. The outer webs of the primaries and secondaries are golden along their basal halves, grading to chestnut-brown (Raw Sienna 136 and Amber 36 are closest). The degree of golden-olive along the length of the secondaries becomes more extensive along the inner secondaries and tertials. The inner webs are dark brown with an iridescent sheen, except the innermost two tertials which show olive (Greyish Olive 43) inner webs. Primaries four to seven (numbered ascendantly) are emarginated along their outer web.

Face and underparts: The lores are black, with black extending over the eye. The auriculars beneath the eye are black with irregular chestnut flecking. The ear-coverts are grey (Smoke Gray 45), suffused pink with indistinct darker central shaft streaks. The chin is black becoming grey mixed with olive (Dark Drab 119B), with black central shaft streaks and small irregular chestnut flecks on the throat. The centre and sides of breast are grey (Glaucous 79) with pale silvery-grey fringes producing a scalloping effect. The belly to vent is grey tinged olive-brown (Olive 30).

Bare parts: Bill blackish horn; legs dark brown; iris dark brown.

Measurements of type (lengths in mm): Maxilla (from skull) 26; tarsus 35; wing (max. chord) 106; tail 121.

Paratypes. Two additional specimens collected on Mount Ngoc Linh at 2,000 m asl on 31 March 1998 are a male held at FIPI, Hanoi, No. 1945.2.10 and a female, Natural History Museum, Tring No. 1998.71.6. Their measurements (lengths in mm) are, respectively: maxilla (tip to skull) 19, 25; tarsus 33, 36; wing (max. chord) 88, 99; tail 137, 112. Specimen No. 1945.2.10 had an iris colour recorded as black; bill blackish horn; legs dark brown. Specimen No. 1998.71.6 had a dark brown iris; bill blackish horn; legs dark brown with paler soles. The holotype is slightly brighter and shows more red in the chestnut crown and has more olive underparts than the female paratype, but overall no significant differences in plumage exist among the three known specimens.

Vocalizations. At *c.* 2,000 m asl on Mount Ngoc Linh on 1 May 1996 JCE recorded a *G. ngoclinhensis* giving a two-noted rather cat-like mewing, with emphasis on the second note. The first note was short (less than 1 s) and descending whilst the second was longer (1.5 s), rising and with a slight downward inflection at the end. The call could be rendered as *Rr raow Rr raow*. The calls were given at intervals of 2–3 s and calling bouts lasted for more than one minute. No *G. ngoclinhensis* were knowingly heard subsequently during 1996 or during fieldwork in 1998.

Since only one call of *G. ngoclinhensis* was recorded and is described here, this is insufficient evidence to determine whether this is its song or whether it possesses a range of vocalizations (as seems likely) which may or may not be significantly different from its closest congeners.

Ecology and behavior. All observations were of single birds or pairs, and one was seen in association with a party of three Red-tailed Laughingthrushes *G. milnei* on 18 May 1996. All observations were between 2,000 and 2,200 m asl. The species occurred almost exclusively in the herb and shrub layers of forest undergrowth. The species was shy and difficult to observe but responded to playback of its call and several observations were made using this technique. Overall, *G. ngoclinhensis* appeared quite typical of the genus in its habits.

Habitat. On Mount Ngoc Linh we found *G. ngoclinhensis* in the undergrowth of primary formations of upper montane evergreen forest (as defined in Whitmore 1992). On Mount Ngoc Linh from *c.* 1,500 to 2,200 m asl the forest canopy height was 10–15 m, with occasional 20 m trees. Above 2,200 m asl, the trees were generally smaller and more slender, with knarled limbs and dense sub-crowns, and there was much moss on trees and the ground. The transition from lower to upper montane forest formations was gradual, however, and many larger trees existed to within 100 m of the summit.

Distribution. *G. ngoclinhensis* was discovered on Mount Ngoc Linh (Kon Tum Province) in the Western Highlands of Vietnam and is currently known only from this site (Fig. 1). We believe it is likely to occur to the north and east in adjacent Quang Nam Province because the provincial boundary bisects Mount Ngoc Linh, and forest habitat within the species' altitudinal range is contiguous across the provincial border on the mountain. Suitable forest habitat within the species' altitudinal range also occurs in neighboring Attapu and Se Kong Provinces in Laos where we expect the species will eventually be discovered. *G. ngoclinhensis* is currently only known from one site to which it may be endemic, although considering the distributions of other *Garrulax* species, this seems unlikely. The range of *G. e. connectens* is known to extend south to only northern Laos, and *G. yersini* is believed to be endemic to a small area in the Da Lat Plateau EBA at the southern limit of the Western Highlands. The absence of a contiguous mountain chain south to the Da Lat Plateau virtually rules out any contact with *G. yersini.* We do not know how far north *G. ngoclinhensis* could extend in the Annamitic Mountains and how far south *G. erythrocephalus connectens* may extend through the same mountain chain.

Etymology. We name this species after the type locality Mount Ngoc Linh which at 2,598 m asl is the highest point in the Western Highlands and the second highest peak in Vietnam. The literal

translation from Vietnamese to English is "sacred precious stone". This little-studied area is proposed as a nature reserve and this is the first species to be named after the site.

Remarks

Under this heading we present the case for affording specific rank to *G. ngoclinhensis* based on its morphology, biometrics, ecology and vocalizations in comparison with its closest congeners: *G. erythrocephalus* and *G. yersini*.

Deignan (1964) recognized 14 taxa within *G. erythrocephalus*. Table 1 shows a simplified summary of the general morphology of all 14 forms of *G. erythrocephalus*, as well as *G. ngoclinhensis* and *G. yersini*, based on an examination of skins of 12 *G. erythrocephalus* taxa in the Natural History Museum, Tring and with reference to the literature in the case of *G. e. schistaceus* and *G. e. subconnectens* (Deignan 1938). Across its wide range in the Indo-malayan realm, *G. erythrocephalus* is highly variable, and the variation in plumage pattern is in some cases clinal and others abrupt and mosaic. Amongst the 14 described forms crown, wing and tail colouration are fairly constant across its geographic range. All forms show chestnut on the hind crown but in some forms there is also a tendency to black, grey and silver streaking on the forecrown. Additionally, all forms retain olive-green remiges and rectrices, with a slight variation in the intensity of green from west to east and from north to south. The nominate and most westerly form retains the most yellow in the wing, whereas the southernmost form *G. e. peninsulae* has the greyest wing. The eight Himalayan forms, i.e. those with their ranges entirely west of the Salween River, are characterized by bold scaling on the mantle and breast and most show a predominance of buff, brown and olive tones in the plumage. The six forms east of the Salween River (*G. e. melanostigma* is included in this group even though part of its range lies west of the Salween River because of plumage similarities with the eastern group) all have unstreaked upperparts. Only *G. e. connectens*, *G. e. subconnectens* and *G. e. schistaceus (shanus)*, show faint scaling on the breast, created by pale feather fringes. Of the six eastern forms, all except *G. e. connectens* show black primary coverts. Their predominant plumage tones are olive and green, and in the case of *G. e. peninsulae*, dark chestnut and cinnamon.

Although more similar to the Indochinese races of *G. erythrocephalus, G. ngoclinhensis* is morphologically sufficiently distinct to warrant specific treatment for the following reasons: *G. negoclinhensis* shows three unique plumage features and also shares a distinctive combination of plumage features with *G. yersini*, which are not shown by any form of *G. erythrocephalus*. Thus *G. ngoclinhensis* is intermediate between these two taxa.

In comparison with *G. erythrocephalus* and *G. yersini, G. ngoclinhensis* has on average a shorter maxilla than *G. e. connectens* but longer than *G. yersini* (Table 2). Its tarsus and wing average shorter

TABLE 1
Summary of plumage features in *G. erythrocephalus*, *G. ngoclinhensis* and *G. yersini*

Taxon	Crown	Mantle	Breast	Ear-coverts	Tail edgings	Wing edgings	Primary coverts	Greater coverts
G. e. erythrocephalus	Chestnut	Olive-green, scaled black	Olive-buff, scaled black	Chestnut, black centres, fringed white	Olive-green	Olive-yellow	Olive-green	Olive, fringed chestnut
G. e. kali	Chestnut	Olive-green, scaled black	Olive-buff, scaled black	Chestnut, black centres, fringed white	Olive-green	Olive-grey-green	Olive-grey-green	Olive, fringed brown
G. e. nigrimentum	Black, fringed grey, chestnut	Brown, scaled black	Brown, scaled black	Black fringed white	Olive-green	Olive-green	Olive-green	Brown, tipped chestnut
G. e. imprudens	Chestnut and black	Olive-grey, scaled black	Olive, scaled black on upper breast	Olive with black centres	Olive-green	Grey suffused green	Olive-green	Olive, tipped chestnut
G. e. chrysopterus	Silvery-grey and chestnut	Olive-brown, scaled black	Light brown, scaled dark brown	Silvery-grey	Olive-green	Olive-green, yellow sheen	Olive-green, yellow-sheen	Olive, tipped chestnut
G. e. godwini	Silvery-grey and chestnut	Olive-brown, scaled black	Cinnamon, fringed black	Pinkish	Olive-green	Olive-yellow	Olive-yellow	Olive, tipped chestnut
G. e. erythrolaema	Grey and chestnut	Olive-green, scaled black	Olive-buff scaled black	Cinnamon	Olive-green	Olive-green	Olive-green	Olive, tipped chestnut
G. e. woodi (forresti)	Grey, black centres and chestnut	Brown, pale fringes	Brown, pale fringes	Silvery-pink	Olive-green	Olive-green	Olive-green	Chestnut
G. e. connectens	Chestnut	Olive-grey-green	Brown fringed olive-grey	Silver grey with dark shaft streaks	Olive-green	Olive-green	Olive-green	Olive, fringed chestnut
G. e. subconnectens	Chestnut	Greyish-olive	Olive-grey scaled brownish-grey	Dusky-brown, silvery or pinkish grey edgings	?	?	Black	?
G. e. schistaceus (shanus)	Chestnut	Olive-grey-green	Dark chestnut, light olive-brown	Blackish with silvery-grey edges	Olive-green	Olive-green	Black	Grey-green tipped chestnut
G. e. melanostigma	Chestnut	Olive-grey-green	Dark chestnut, light olive-brown	Blackish with silvery-grey edges	Olive-green	Olive-green	Black	Grey-green tipped chestnut
G. e. ramsayi	Chestnut	Olive-brown-green	Dark chestnut, pale cinnamon	Blackish with silvery-grey edges	Olive-green	Olive-green	Black	Grey-green tipped chestnut
G. e. peninsulae	Dark chestnut	Dark olive-brown	Dark chestnut and cinnamon	Brown with silvery-grey edges	Olive-green	Olive-green	Black	Dark chestnut
G. ngoclinhensis	Grey and chestnut	Grey, olive tinge	Grey fringed pale grey	Grey suffused pink	Olive-grey strongly suffused golden	Golden	Black	Olive, tipped chestnut
G. yersini	Black	Orange chestnut	Pale orange chestnut	Silvery-grey	Golden	Golden	Black	Grey, chestnut fringes

TABLE 2
Comparison of biometrics amongst *Garrulax erythrocephalus connectens, G. yersini* and *G. ngoclinhensis* based largely on specimens in the Natural History Museum, Tring. In each cell the biometric range is given, followed by the mean and finally the sample size. All measurements are in mm

Taxon	Maxilla (tip to skull)	Tarsus	Wing (max. chord)	Tail	Sex
G. e. connectens	23–26 (24.0) [10]	36–39 (37.7) [10]	96–110 (104.4) [10]	109–126 (114.9) [10]	4 m, 4 f, 2?
G. ngoclinhensis	19–26 (23.3) [3]	33–36 (34.6) [3]	88–106 (97.6) [3]	112–137 (123.3) [3]	2 m, 1 f
G. yersini	21–24 (22.5) [8]	36–41 (38.6) [8]	101–118 (111.6) [8]	118–133 (122.7) [8]	4 m, 4 f

than its closest two congeners, but its tail is longer than of *G. e. connectens*. There is, however, extensive overlap in biometrics within these two species and sample sizes are too small to show significant differences.

Under the phylogenetic species concept a species is defined as an irreducible (basal) cluster of organisms, diagnosably distinct from other such clusters and within which there is a parental pattern of ancestry and descent (Cracraft 1989). The possession of only one diagnostic character would mean that the new taxon could be considered a species under the phylogenetic species concept. We prefer however, to approach the question of appropriate taxonomic rank for this taxon using the biological species concept. Under the biological species concept a species comprises groups of interbreeding natural populations that are reproductively isolated from other such groups (Mayr 1969), and under this concept both *G. erythrocephalus* and *G. yersini* have been considered to comprise good species by Deignan (1964), Sibley and Monroe (1990) and Inskipp *et al.* (1996). With a case for specific rank already established on the basis of morphology, we now consider the ecology and the sexual behaviour of species, especially the development of a unique song, which are the two other criteria often subjectively used to demonstrate reproductive isolation.

The known range of *G. ngoclinhensis* is *c.* 700 km south from that of *G. erythrocephalus* and *c.* 300 km north of the range of *G. yersini*. We believe, that *G. ngoclinhensis* is allopatric with both *G. erythrocephalus* and *G. yersini* and therefore reproductively isolated. In the absence of any data for their ranges meeting or overlapping, it is only possible to assess the taxonomic status of *G. ngoclinhensis* as if it were allopatric. However, if the ranges of these two species were to meet, would reproductive isolation be maintained in sympatry?

We currently only have the briefest indications of the habitat and altitude range of *G. ngoclinhensis* but in both it shows strong similarities with its closest congeners. Amongst the forms of *G. erythrocephalus* occurring east of the Salween River *G. e. melanostigma* was collected in dense evergreen or bamboo forest between 1,310–2,560 m asl, *G. e. schistaceus* was obtained in dense evergreen forest between 1,524–2,133 m asl, *G. e. subconnectens* in heavy evergreen forest between 1,371–1,676 m asl, whilst *G. e. connectens* was collected at 2,000 m asl (Delacour & Jabouille 1931, Deignan 1945), and *G. e. peninsulae* was recorded frequenting the ground and lower storeys of montane forest above 1,066 m (Medway & Wells 1976), *Garrulax yersini* again inhabits undergrowth in evergreen forest from 1,800 to 2,500 m asl (Delacour & Jabouille 1931). Thus on the basis of the available data, these three species occupy overlapping altitudinal ranges.

Vocalization, specifically song, is also traditionally used to confirm specific rank. Although we are not able to provide any conclusive evidence, we believe that even if the songs of *G. ngoclinhensis* and *G. erythrocephalus* proved to be identical this would not in itself disprove the validity of *G. ngoclinhensis* as a good species, especially (as seems

likely) if it is allopatric with *G. erythrocephalus*. In allopatric species, there may be no evolutionary mechanism, which leads to the development of distinctive song, at work. Thus, two taxa may be distinctive species although they may have identical songs. This is a documented phenomenon among closely related species of *Garrulax*: The Bare-headed Laughingthrush *G. calvus* of Borneo has a song identical with Black Laughingthrush *G. lugubris*, which is endemic to the Malay peninsula and Sumatra. Despite their dissimilar appearance and being allopatric, it has been suggested that they are conspecific because a positive response was elicited from one species when played the call of the other (Harrap 1992). In this case there would have been no evolutionary advantage for the two taxa to evolve distinctive songs since they are spatially separated. Furthermore, closely related species of *Garrulax* will respond to songs of their congeners anyway, especially as they often flock together. On Mount Ngoc Linh a small flock of *G. milnei* responded to a tape of *G. ngoclinhensis* and at O Quy Ho near Sa Pa in north-west Vietnam, several *G. milnei* responded to a *G. erythrocephalus* duetting with a Red-faced Liocichla *Liocichla phoenicea* (JCE pers. obs.). Additionally, *Garrulax* vocalizations are difficult to use as taxonomic characters because of mimicry and variability of repertoires.

In conclusion, our case for the validity of *G. ngoclinhensis* as a good species rests on its distinctive morphology, and its reproductive isolation is suspected but unproven. Furthermore, from the data presented, we can conclude that *G. erythrocephalus* is an extremely variable taxon and that the Salween River is a natural divide between the eight Himalayan subspecies from the five Indochinese and sole sundaic subspecies. On this basis, consideration should therefore be given to splitting *G. erythrocephalus* into two (or more) species. A thorough taxonomic revision of the phylogeny of *G. erythrocephalus*. *G. ngoclinhensis* and *G. yersini* group would be required to resolve this question. Given this context, to have described *G. ngoclinhensis* as a mere subspecies of *G. erythrocephalus*, rather than a species, would have added another level of variability to what is already an extremely variable taxon.

Conservation

The forests of the proposed Ngoc Linh Nature Reserve comprise a mosaic of primary and seral forest formations, and shifting cultivation, indicating a long history of human utilization. During the 1996 fieldwork there was no evidence of recent forest clearance for new terraces around Mount Ngoc Linh. In 1998, however, we saw recently burnt patches of secondary forest which were being prepared for agriculture. In the west of the proposed nature reserve along Highway 14, the forest has been recently cleared for shifting cultivation, although this is below the species's known altitudinal range. Following a boundary revision, the proposed Ngoc Linh Nature Reserve now extends across 41,420 ha, of which 35,869 ha (87% of the total area) were classified by FIPI in 1995 as covered with forest (all categories). Of this 24,665 ha (60%) was classified as primary forest (Le Trong Trai